324. **Proposed by R. D. CARMICHAEL, Princeton University.**

Sum the *finite* series

$$\frac{16n^2-2^2}{4!}-\frac{(16n^2-2^2)(16n^2-4^2)}{6!}+\frac{(16n^2-2^2)(16n^2-4^2)(16n^2-6^2)}{8!}-\dots$$

where n is a positive integer.

Solution by G. B. M. ZERR, A. M., Ph. D., Philadelphia, Pa.

$$\cos m\theta=1-\frac{m^2}{2!}\sin^2\theta+\frac{m^2(m^2-2^2)}{4!}\sin^4\theta-\frac{m^2(m^2-2^2)(m^2-4^2)}{6!}\sin^6\theta+\dots$$

Let $m=4n$, then

$$\cos 4n\theta=1-\frac{16n^2}{2!}\sin^2\theta+\frac{16n^2(16n^2-2^2)}{4!}\sin^4\theta$$

$$-\frac{16n^2(16n^2-2^2)(16n^2-4^2)}{6!}\sin^6\theta+\dots$$

Let $\theta=\frac{1}{2}\pi$, then $\cos 4n\theta=\cos 2n\pi=1$.

$$\therefore 1=1-\frac{16n^2}{2!}+\frac{16n^2(16n^2-2^2)}{4!}-\frac{16n^2(16n^2-2^2)(16n^2-4^2)}{6!}$$

$$+\frac{16n^2(16n^2-2^2)(16n^2-4^2)(16n^2-6^2)}{8!}-\dots$$

$$\therefore \tfrac{1}{2}=\frac{(16n^2-2^2)}{4!}-\frac{(16n^2-2^2)(16n^2-4^2)}{6!}$$

$$+\frac{(16n^2-2^2)(16n^2-4^2)(16n^2-6^2)}{8!}+\dots$$

GEOMETRY.

345. **Proposed by LLOYD HOLSINGER, Bradley Polytechnic Institute, Peoria, Ill.**

If a variable polygon move in such a way that its n sides turn severally round n fixed points O_1, O_2, ..., O_n while $n-1$ of its vertices slide, respectively, along $n-1$ fixed straight lines v_1, v_2, ..., v_{n-1}, then the last vertex will describe a conic; and the locus of the point of intersection of any pair of non-adjacent sides will also be a conic. Cremona's *Projective Geometry*.